Yuzhou Zhu

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Dalian, Liaoning, China

EDUCATION

• **Dalian University of Technology** *September 2023 - June 2027*
Bachelor of Science Dalian, China
  ◦ Major: Foundations of Mathematical Science
  ◦ GPA: 93.1/100

• **University of Leicester** *September 2023 - June 2027*
Bachelor of Science Leicester, UK
  ◦ Major: Mathematics
  ◦ GPA: 86.64/100

Dalian University of Technology Major Courses

Course	Credit	Grade
Introduction to Mathematical Science	3	92
Analytic Geometry	4	100
Intro to Computing and Programming	5	99
Probability	4	100
Data Structures and Algorithms	4	100
Higher Algebra I	4	99
Mathematical Analysis I	5	98
Introductory Statistics	4	98
Advanced Algebra II	4	99
General Physics A1	4	95
Mathematical Analysis II	5	98
Major GPA		**98.15 / 100**

University of Leicester Major Courses

Course	Credit	Grade
Introduction to Mathematical Science	15	79.70
Analytic Geometry	15	97.50
Introduction to Computer Programming	30	92.38
Algorithms, Data Structures and Advanced Programming	15	96.71
Probability	15	97.00
Introductory Statistics	15	91.40
Calculus and Analysis	30	90.20
Linear Algebra	30	95.80
Major GPA		**92.64 / 100**

PUBLICATIONS
C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

[S.1] **Yuzhou Zhu**, et al. (2025). **Functional-Basis Neural Layers: Learning Adaptive Weight Functions for Universal Approximation**. In preparation for submission (Target: *ICLR 2026*).

[S.2] **Yuzhou Zhu**, et al. (2025). **From Static to Dynamic: A Streaming RAG Approach to Real-time Knowledge Base**. Manuscript submitted to *AAAI 2026*.

[S.3] **Yuzhou Zhu**, et al. (2025). **SinBasis Networks: Matrix-Equivalent Feature Extraction for Wave-Like Optical Spectrograms**. Manuscript submitted to *AAAI 2026*.

[C.1] **Yuzhou Zhu**, et al. (2025). **SAKR: Enhancing Retrieval-Augmented Generation via Streaming Algorithm and K-Means Clustering**. In *Proceedings of the 2025 International Conference on Intelligent Computing*. Accepted on Jun 26, 2025.

PROJECTS

• **SAKR: Enhancing RAG via Streaming + K-Means** *ICIC 2025 — accepted Jun 2025 (2025-06-26)*
Tools: PyTorch, FAISS [] [arXiv]
  ◦ Achieved **0.640** avg accuracy on a news stream while using **10%** of Naive RAG memory ($\sim$**90%** reduction).
  ◦ Pre-clustered retrieval cut search from $O(N \cdot n \log n)$ to $O(N \cdot m \log m)$, reducing end-to-end query time on large corpora.
  ◦ **Role**: Built the full codebase and ran **all experiments**.

• **From Static to Dynamic: Streaming RAG** *Under review (AAAI 2026), submitted Aug 2025*
Tools: Python, FastAPI [] [arXiv]
  ◦ **Recall@10 +3 pts** (paired t-test $p < 0.01$), $<$**15 ms** E2E latency, $>$**900 docs/s** throughput under a **150 MB** budget.
  ◦ In open-domain QA (GPT-3.5), **+3.2 EM / +2.8 F1**; incremental upsert keeps KB fresh without rebuilds.
  ◦ **Role**: Sole author — designed pipeline (multi-vector screening + mini-batch clustering + heavy-hitter), implemented FastAPI service.

- **SinBasis Networks: Matrix-Equivalent Periodic Priors** *Under review (AAAI 2026), **submitted Aug 2025***
  Tools: PyTorch, NumPy [〇] [arXiv]
  - Evaluated on **80,000** synthetic attosecond spectrograms + multiple optical/audio datasets; improved reconstruction accuracy, translational robustness, and zero-shot cross-domain transfer.
  - Embedded **1-Lipschitz** $\sin(\cdot)$ reparam into CNN/ViT/Capsule to encode periodic priors with minimal overhead.
  - **Role**: Sole author — theory, implementation, experiments end-to-end.

- **Functional-Basis Neural Layers** *In preparation (**as of Sep 2025**; target ICLR 2026)*
  Tools: PyTorch, NumPy [〇]
  - **ImageNet**: Top-1 **76.4%** $\rightarrow$ **77.6%** (**+1.2%**) by replacing FC layers; **WikiText-103** perplexity **17.8** $\rightarrow$ **16.9**.
  - **512$\times$512 Navier–Stokes**: MSE **8.5e-4** $\rightarrow$ **7.9e-4** vs. FNO; with universal approximation + convergence bounds.
  - **Role**: Sole author — proposed layer, proved theory, built code and ran all experiments.

SKILLS

- **Programming Languages:** Python, C/C++, Java, Matlab
- **Data Science & Machine Learning:** Pytorch, Tensorflow
- **Specialized Area:** Neural Network, RAG, Algorithms, Algebra, Probability

HONORS AND AWARDS

- **National Scholarship of China** *Oct 2024*
  Ministry of Education of China
  - Highest national undergraduate merit scholarship; highly selective; outstanding academic performance

- **National Undergraduate Mathematics Competition (CMC) — Professional Group** *Sep 2023, Sep 2024*
  Chinese Mathematical Society
  - Provincial First Prize and National Second Prize in both 2023 and 2024
  - Demonstrated strength in calculus and analysis, algebra, and combinatorics problem solving

LEADERSHIP EXPERIENCE

- **ICPC Team Captain / Algorithm Competition Association's Vice President** *Sep 2023 – Present*
  Dalian University of Technology [〇] [〇]
  - Authored core C++ competitive programming templates (graphs, DP, number theory, ...) and compiled code
  - Developed Java data-structure and algorithm reference implementations shared with undergraduate students